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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/586,530	07/19/2006	Kunihiro Ukai	L7002.06104	6082

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EXAMINER	
AKRAM, IMRAN	

ART UNIT	PAPER NUMBER
1723	

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06/22/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/586,530	UKAI ET AL.	
	Examiner	Art Unit	
	IMRAN AKRAM	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-23,25-31 and 33-36* is/are pending in the application.

4a) Of the above claim(s) *1 and 4-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-23,25-31 and 33-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6/14/11 have been fully considered but they are not persuasive. No amendment has been filed; the rejections are the same as previous.

2. Applicant asserts on pages 18 and 21 of the Arguments that Examiner has misconstrued or left out key components of Applicant's arguments. Examiner respectfully disagrees. Examiner believed the arguments were addressed, but will attempt to elaborate on each rebuttal as best as possible.

3. First, Applicant's arguments relating to the Maenishi reference will be discussed. Applicant asserts in paragraph 1 of page 19 that "Applicants' independent claims require that the shift converter temperature and/or steam to carbon ratio are increased" is invalid. Claims 21 and 29 (they will be addressed together) do not recite that the shift converter temperature is increased. They instead state that the "temperature of the reformed gas flowing in said shift converter" is increased. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). This difference is significant because, while the reformed gas temperature increase may increase the temperature of the shift converter, the Examiner is not concerned with whether Maenishi (or the other references) teaches this feature. Instead, it is the Examiner's position that Maenishi increasing the temperature of the reformate based on the number of times of start and stop. This increase in reformate temperature will result

in a higher temperature for the reformate entering the shift reactor as the shift reactor is downstream of the reformer.

4. Applicant asserts in paragraph 2 of page 19 that the paragraph 104 does not contain a shift converter. This is true. The embodiment of Maenishi in which a shift convert is located downstream of the reformer is found in paragraph 135. Paragraph 104 is relied upon, and often, for its teaching of the step of counting the number of times of start and stop of the hydrogen generator (which includes the combustor) and increasing the temperature of the reforming catalyst based on the number of times of start and stop. Whether this occurs automatically is not relevant (control systems, by definition, are automatic). What matters is that Maenishi discloses recording the reformer catalyst temperature, counting a number of times of start and stop of the hydrogen generator, and then increasing the temperature via increasing the number of times of start and stop. These steps are all clearly located in paragraph 104. What is a result of these steps is that reformer catalyst temperature increases and consequently reformate temperature increases. Since the shift reactor is located downstream of the reformer, the reformate temperature in the shift reactor is also increased.

5. Applicant asserts in paragraph 2 of page 20 that only the combustor of Maenishi is started and stopped and not the hydrogen generator. Examiner respectfully disagrees. The hydrogen generator includes the combustor. Applicant has defined, in the claims, that the hydrogen generator comprises the reformer and the shift reactor. The hydrogen generator is not then the same thing as the reformer and it can also include other components such as a combustor. Therefore, the start and stop of the

combustor, a component of the hydrogen generator, is also the start and stop of the hydrogen generator.

6. Applicant asserts on the bottom of page 20 and top of page 21 that the Maenishi reference cannot disclose increasing the reformed gas temperature in the shift converter since reformate is not created during the start and stop of the combustor. Examiner respectfully disagrees. As shown above, and stated explicitly in paragraph 104, the reformer catalyst and reformate temperature is increased due to an increase in start and stops of the combustor. The claim is thus anticipated.

7. Second, Examiner will address the Taguchi reference. Again, the Applicant incorrectly states that the claim requires "the shift converter temperature and/or steam to carbon ratio are increased." The claim states only that the reformate temperature in the shift converter is increased. In fact, each argument towards Taguchi states that the Taguchi does not disclose controlling the shift converter temperature. The arguments are therefore spurious.

8. Third, Examiner will address the Ukai reference. As reiterated by Applicant, paragraph 18 of Ukai discloses increases the temperature of the reformate through the shift reactor and paragraph 139 discloses starting and stopping the hydrogen generator. More clearly, paragraph 139 of Ukai discloses that the reformed gas temperature was controlled through a start/stop operation of 200 times. This control is based a cooling heat exchanger and what is disclosed in paragraph 18: that reformer temperature would increase based on flow rate. Therefore, the number of times the device is started and stopped would increase the reformer/reformate temperature.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 21, 22, 29, and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Maenishi (US 2005/0129997 A1).

11. Regarding claim 21, Maenishi discloses a process comprising: including a steam reformer with a material supply, water supply (paragraph 2), and shift reactor (paragraph 135); counting the number of times the reformer starts and/or stops (paragraph 104); and increasing the temperature based on the number of starts and/or stops (paragraph 104).

12. Regarding claim 29, Maenishi discloses a process comprising: including a steam reformer with a material supply, water supply (paragraph 2), shift reactor (paragraph 135), and fuel cell (paragraph 39); counting the number of times the reformer starts and/or stops (paragraph 104); and increasing the temperature based on the number of starts and/or stops (paragraph 104).

13. Regarding claims 22 and 30, Maenishi discloses a temperature adjustment means and increasing the temperature based on the number of times of start and/or stop (paragraph 104).

14. Claims 21, 22, 26, 27, 29, 30, 34, and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Taguchi (US 2003/0175562 A1).

15. Regarding claim 21, Taguchi discloses a process comprising: including a steam reformer with a material supply and water supply (paragraph 213) and shift reactor (paragraph 17); counting the number of times the reformer starts and/or stops (paragraph 76); and increasing the temperature based on the number of starts and/or stops (paragraph 132).

16. Regarding claim 29, Taguchi discloses a process comprising: including a steam reformer with a material supply and water supply (paragraph 213), shift reactor (paragraph 17), and fuel cell (paragraph 1); counting the number of times the reformer starts and/or stops (paragraph 76); and increasing the temperature based on the number of starts and/or stops (paragraph 132).

17. Regarding claims 22 and 30, Taguchi discloses a temperature adjustment means and increasing the temperature of the reformed gas (paragraph 10).

18. Regarding claims 26 and 34, Taguchi discloses counting the number of times of start and/or stop and increasing the temperature of the system based on this (paragraph 123). It is necessary in Taguchi that the number of times of start and stop be output in some manner for the device to operate.

19. Regarding claims 27 and 35, Taguchi discloses counting the number of times of start and/or stop and increasing the temperature of the system based on this (paragraph 123) and increasing the temperature of the reformer based on time accumulated (paragraph 52).

20. Claims 21-23 and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Ukai (US 2001/0002248 A1).

21. Regarding claim 21, Ukai discloses a process comprising: including a steam reformer with a material supply, water supply, and shift reactor (paragraph 47); counting the number of times the reformer starts and/or stops (paragraph 139); and increasing the temperature based on the number of starts and/or stops (paragraph 18).

22. Regarding claim 29, Ukai discloses a process comprising: including a steam reformer with a material supply, water supply, and shift reactor (paragraph 47) and fuel cell (paragraph 2); counting the number of times the reformer starts and/or stops (paragraph 139); and increasing the temperature based on the number of starts and/or stops (paragraph 18).

23. Regarding claims 22 and 30, Ukai discloses a temperature adjustment means and increasing the temperature of the reformed gas (paragraph 18).

24. Regarding claims 23 and 31, Ukai discloses increasing the s/c ratio of the reformed gas by modifying the water supply and material feed supply (paragraph 82).

Claim Rejections - 35 USC § 103

25. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

26. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

27. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

28. Claims 25, 28, 33, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ukai as applied to claims 21 and 29, respectively.

29. Regarding claims 25 and 33, Ukai discloses an air source for the shifted reformate (paragraph 95) and a CO selective oxidation (purifier) unit (paragraph 12), further comprising the steps of: measuring controlled temperature data and corresponding it to the number of times of start and/or stop and CO concentration (paragraph 185); selecting the temperature based on the number of starts and/or stops and consequently choosing the CO concentration based on this temperature (paragraph 185); and modifying the air flow rate to the reformer based on a temperature detector of the reformer (paragraph 53). Ukai discloses increasing the S/C ratio of the reformed gas (paragraph 82), but not that this increase is based upon the number of times of start/stop or the accumulated process time. Ukai does, however, disclose that the CO concentration of the shift effluent increases with start and stop of the reformer (paragraph 139) and that an increase in S/C ratio decreases the CO concentration (paragraph 82). Carbon monoxide is a well-known catalyst poison and should be minimized (paragraph 8). It should have been obvious to one having ordinary skill in the art at the time of invention to increase the S/C ratio as done in Ukai when the apparatus is started and/or stopped over a period of time to minimize the CO formed as suggested in Ukai.

30. Regarding claims 28 and 36, Ukai discloses increasing the S/C ratio of the reformed gas (paragraph 82), but not that this increase is based upon the number of times of start/stop or the accumulated process time. The measurement of time is

inherent to Ukai, as it is any process in which time is being taken into account. Ukai does, however, disclose that the CO concentration of the shift effluent increases with start and stop of the reformer (paragraph 139) and that an increase in S/C ratio decreases the CO concentration (paragraph 82). Carbon monoxide is a well-known catalyst poison and should be minimized (paragraph 8). It should have been obvious to one having ordinary skill in the art at the time of invention to increase the S/C ratio as done in Ukai when the apparatus is started and/or stopped over a period of time to minimize the CO formed as suggested in Ukai.

Conclusion

31. This is a RCE. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IMRAN AKRAM whose telephone number is (571)270-3241. The examiner can normally be reached on 10-7 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/I. A./
Examiner, Art Unit 1723

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1723